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Toward constructivism for adult learners in online learning environments

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Abstract
Since online learning has a different setting from the conventional classroom, online educators need to use some special techniques and perceptions to lead to success. Moreover, adults have special needs and requirements as learners compared with children and adolescents, thus online educators should know how adults can learn best because of their special characteristics. Philosophical and methodological shifts also affect instruction. Many researchers have suggested that constructivism should be applied in distance education. Thus, this paper attempts to examine the impact of constructivism in online learning environments when focusing on adult learners. The author develops the connection between constructivism and adult learning theory. In addition, the paper proposes instructional guidelines using the constructivist approach in online learning for adults.

Introduction

Many commentators have argued that distance education requires a qualitatively new pedagogy built on a unique relationship between the instructor and the learners. Traditional education or one-way televised learning at a distance often produces boredom. Students learn passively because the instructor is the sage and the source of knowledge (Markel, 1999). Besides, adult learners always bring their unique learning characteristics to the learning situation, so an effective instructor should recognize learners' characteristics to help them learn best (Ference and Vockell, 1994).

Brey's (1988) study of community college students showed that they are older, employed, have dependents at home and have interrupted their education. More than 60% of students are female and 80% have jobs. In addition, students' work and personal schedules vary widely, and they have a variety of life and work experiences. It is particularly difficult for adults to have on-campus classes because of the demands of job and personal schedules (Brey, 1988; Porter, 1997).

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An online learning model is proposed in which an instructor and learners are separated by physical distance, and online delivery media are used to bridge the instructional gap. Moving into the information technology era, a wide range of instructional technologies facilitates online educators (Huang, 2000). In general, an online computer-mediated environment includes synchronous and/or asynchronous communication, Web-based instruction, Web search, online resources, and technical support (Huang, in press). One of the most salient features of online learning is that it allows learning to be place and time independent (Vrasidas and McIsaac, 2000). Adult learners can arrange their learning around their everyday lives without being constrained by time and place. Moreover, online learning allows learners to take courses not available on campus resulting in cost effective learning environments, and utilizes some appropriate delivery and instruction methods. So, it becomes quite clear that a lot of people can benefit from this second chance to educate themselves.

Distance education has different settings from the conventional classroom due not only to the physical distance between an instructor and learners but also to the difference in designs of instruction in distance learning (Moore, 1991). Since distance education cannot offer face-to-face instruction as the traditional classroom does, many researchers (Comeaux, 1995; McHenry and Bozik, 1995; Eastmond and Lawrence, 1997–98; McDonald and Gibson, 1998) focused on the study of interaction in distance education. Moore (1991) also noted that the interaction of the individual or group is determined by the educational philosophy in distance learning. Constructivists, such as Dewey (1916), Vygotsky (1978) and Bruner (1996), view knowledge as constructed by learners through social interaction with others. Recently, Jonassen *et al.* (1995), Moller (1998), and Petraglia (1998), proposed that constructivism should be applied in distance education and educational technology. However, Petraglia (1998, 53) argued [that we should make] "the attempt to make learning materials and environments correspond to the real world prior to the learner's interaction with them".

The purpose of this paper is to explore the impact of a constructivist approach in online learning for adult learners. Since philosophical and methodological shifts also affect instruction, online educators need to consider carefully the influence on the learners before they apply a new educational philosophy or pedagogy. This paper attempts to develop conceptual insights of online learning for enhancing the teaching and learning environments.

Theories reviewed

Constructivism

Many educational psychologists were more concerned with what was going on inside the human brain than how to get in. Dewey (1916), Piaget (1973), Vygotsky (1978) and Bruner (1996) each proposed that learners could learn actively and construct new knowledge based on their prior knowledge. In these perspectives, the role of instructor is a facilitator (Ornstein and Hunkins, 1998). For Dewey (1916), a situation represents the experiences of the environment affecting the learner, and interaction takes place between the learner and his or her environment. So, knowledge is based on active

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experience. However, Piaget and Dewey each believed that the educator's role involves the shaping of learners' real experience from the environment, and knowing what surroundings tend to promote experiences that lead to growth (Ornstein and Hunkins, 1998).

Dewey (1916) considered that the main function of education was to improve the reasoning process. He also recommended adapting his problem-solving method to many subjects. A student who is not motivated will not really perceive a problem, so problems selected for study should be derived from learner interests (Ornstein and Hunkins, 1998). Therefore, the methods of constructivism emphasize development of learners' ability in solving their real life problems. As a result, problem solving and free discovery come together. In other words, knowledge is dynamic and is built around the process of discovery (Dewey, 1916). Dewey considered the teacher as a guide rather than a director since learning allowed for creative interaction with the teacher rather than outcome-based teaching.

Vygotsky placed more emphasis on the social context of learning. Vygotskian theory emphasizes the importance of the socio-cultural context in which learning takes place and how the context has an impact on what is learned (Vygotsky, 1978). Since Vygotsky emphasized the critical importance of interaction with people, including other learners and teachers, in cognitive development, his theory is called "social constructivism" (Maddux, Johnson and Willis, 1997). Much of collaborative problem solving strategy is built on the best known of Vygotsky's idea, the zone of proximal development (ZPD).

Adult learning theory

Knowles proposed a theory of adult learning, pedagogy for adults, called Androgogy (Knowles, Holton III and Swanson, 1998). There are six principles of Androgogy for adults. The first principle is the learner's need to know: "how learning will be conducted, what learning will occur, and why learning is important" (Knowles *et al.*, 1998, 133). Second, self-directed learning is the ability of taking control of the techniques and of the purposes of learning. Then, prior experience of the learner impacts learning in creating individual differences, providing rich resources, creating biases and providing adults' self-identity. The fourth principle is readiness to learn. Adults become ready to learn when their life situations create a need to learn. The fifth principle is orientation to learning. In general, adults prefer a problem solving orientation in learning. In particular, they can learn best when knowledge is presented in real-life context. Finally, the sixth principle is motivation to learn. Adults have high motivation to learn when the learner can gain the new knowledge to help them to solve important problems in their life.

Brookfield (1995) also explored four major, unique and exclusive adult learning processes. First, self-directed learning focuses on the process by which adults take control of their learning. Especially, they set up their learning goals, look for appropriate resources, decide on their learning styles and evaluate their progress. Then, critical reflection is a form and process, of learning how adults think contextually and critically.

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Third, experiential learning is such that adult teaching should be based on adults' experiences. Thus, those experiences could be a valuable resource. Finally, learning to learn is very crucial for adult development. When they become skilled at learning, adults have the ability of lifelong learning.

As Lieb (1999) stated, adult educators notice that learning happens in each individual as a continual process throughout life. Regarding individual differences, it is natural for learners to be anxious or nervous when facing a new learning situation. Moreover, adults need high motivation for their learning since they have more responsibilities for their work and families. So, instructors need to give positive reinforcement at the proper time and present materials that are well structured in order to increase the chances of success.

Online technologies

For Bruner, technology is a powerful tool for instruction. As Bruner (1966, 34) said,

> "Principal emphasis in education should be placed upon skills—skills in handling, in seeing and imaging, and in symbolic operations, particularly as these are related to the technologies that have made them so powerful in their human expression."

Technologies are cognitive tools help learners to elaborate on what they are thinking and to engage in meaningful learning (Jonassen, 2000). In addition, Jonassen (2000, 24) summarized that learners use technologies as intellectual partners in order to:

1. Articulate what they know;
2. reflect on what they have learned;
3. support the internal negotiation of meaning making;
4. construct personal representations of meaning; and
5. support intentional, mindful thinking.

Many commonly used technologies can provide support for online learning, such as the Web, online discussion groups, online resources, and online courseware (Huang, 2000). The World Wide Web (Web) provides hypertext linked and hypermedia ability to facilitate educational instruction. Hypermedia and Web publishing are knowledge construction environments often incorporating information search engines for better understanding information and video for visualizing the range of ideas that students generate (Jonassen, 2000). The Web provides immense resources for adult learners. Through Web mechanisms, the learner can search actively and discover rich resource to solve problems or construct his or her own knowledge. Thus, the Web becomes a common tool for learner-centered or constructivist learning.

Email (voice mail), listservs, chat rooms, newsgroup or Bulletin Board System (BBS) via Internet can keep all learners of a learning group up to date to be formed and maintained by group teams online. Synchronous and asynchronous discussion focus the development of knowledge-building communities where participants share information in the pursuit of a meaning, and reflect on the knowledge that they have constructed, and the processes that they used (Jonassen, 2000).

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As Chen (1997) noted, many technologies can meet varied individual needs and each technology has its own particular instructional strengths. The newest technology product or the most expensive tool may not be the best one, but appropriate types of technology can really assist learners to improve their achievement. Sometimes, it may need appropriate selection and choice of a mix of delivery methods to meet the online learners' needs. Thus, the role of technology is the same as the instructor's: to be a facilitator in online learning.

Issues of constructivist approach for online learning

There are seven issues of constructivism for online educators. First of all is the issue of humanity and the learner's isolation, since individual learning at a distance is a basic design for online learning. Many distance educators attempt to use such advanced technologies as teleconferencing, the Internet and video conferencing to improve interaction in distance learning. However, as Kearsley (1998, 49) wrote, "Educators fail to understand that distance education is really about creating a different kind of structure for learning and teaching, not the use of technology". Spitzer (1998) also criticized the fact that some distance educators don't recognize that technology and social context are equally important for distance learning. Moreover, the online learning environment constrains us by allowing communication through the computer technology, not a real person. It loses some humanity or it forms social isolation.

Second, distance learners should determine the quality and authenticity of their learning (Lundin, 1998; Westera, 1999). Adult learners usually have strong self-direction in learning, so they are actively participating learners. In online learning environments, the Internet provides only information. As a matter of fact, some learning takes place beyond the instructor's scope, for example, in discussions and in collaboration with peer learners. However, a lot of responses from fellow learners may be ineffective, incomplete or even erroneous (Westera, 1999).

The third implication is the real role of educators (instructors) in distance learning. While designing a distance course, the instructor should notice the real situations in physical distance with learners (not the same as conventional courses in classrooms) and adult learning characteristics. Even though the learner's autonomy meets the expectation of the constructivist approach, the instructor's role is that of facilitator. That is, the learners move from passive receivers to control their learning. The instructor may change his or her role to be a consultant, guide, and resource provider (Markel, 1999).

The fourth issue, pre-authentication, is a controversy in the constructivist approach. Petraglia (1998, 53) defined pre-authentication as "the attempt to make learning materials and environments correspond to the real world prior to the learner's interaction with them". Normally, educators or instructors predetermine what authentic learning is in their instruction. Even through online courses designed by hypertext or hypermedia, the information available to learners in such environments is not provided by the real world. That is, it might come from developers' ideas and conceptual associations of what the real world would look like (Petraglia, 1998). In learners' points of

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view, that might not be authentic for them, since they might have different perceptions from those of the instructor.

Fifth, one argument of the constructivist approach is that the evaluation of learners' achievement is time consuming. In other words, it is not easy to evaluate learners' learning outcomes. "For Dewey, experience is always the starting point of an educational process; it is never the result" (Knowles *et al.*, 1998, 94). Thus, for Dewey, the quality of the process of learning is more important than the result. On the other hand, the "learning to learn" of adult learning theory also focuses on the learning process, not only the result.

A sixth argument is that constructivists emphasize that teaching and learning should be learner-centered. On the other hand, adult learning focuses on learners as individuals since they have large and different prior experience or knowledge. Until now, it is still hard for instructional designers (instructors) to develop the individual curriculum for each learner. But, Bill Gates noted, "Information technology will not only bring mass-produced information to students, but all such information will be customized to their learning styles, their cultural backgrounds, their educational interests and their academic goals" (Ornstein and Hunkins, 1998, 374). Then, it will be possible to have twenty-five curricula for twenty-five students based on the assistance of information technology (Ornstein and Hunkins, 1998).

Seventh, collaborative learning is in conflict with individual differences. Based on individual differences, adult learning emphasizes learner-centered instruction. But, social constructivism contends that knowledge is constructed by social interaction and collaboration learning (McDonald and Gibson, 1998). That is, experienced individuals can help inexperienced learners by collaborative learning. In contrast, adult learners are characterized by taking control on their learning process and objective. As a result, when the teamwork of collaborative learning is required, the instructor might experience difficulty in taking into account individual learning objectives, preferences and capabilities (Westera, 1999).

Constructivism in adult learning at a distance

Instructional designers in distance or technology education face the challenge of reflecting a philosophical and methodological shift, from behavioral to cognitive perspectives and then from objectivist to constructivist perspectives (Lundin, 1998; Gibson, 1997; Jonassen, 1994; Jonassen *et al.*, 1995; Moller, 1998; Sherry, Fulford and Zhang, 1998; Petraglia, 1998; Wagner and McCombs, 1995; Westera, 1999). Driving from constructivism, the instructional principles that can guide the practice of teaching and the design of online learning are discussed as follows:

Interactive learning

Constructivists such as Vygotsky and Dewey believed that learners do not learn in isolation from others, and cognitive psychology has gradually established that people naturally learn and work collaboratively in their lives (Petraglia, 1998). Interactivity

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provides a way to motivate and stimulate learners. Moreover, it offers a way through activities and online discussion technology for instructors to cause learners to consider and reflect on the content and process of learning. No doubt, not all learners actively engage interaction among individuals in learning group. Instructors could assist them to identify and to build on active and passive participative group discussion. For instance, instructors can set discussion plans which ask all the learners to participate in group-discussions at the same time via synchronous communication tools such as online chats, online conferences or Multi User Dungeons (MUD). On the other hand, instructors can also ask learners to reflect and respond learning contents every week through asynchronous communication tools such as Listservs, newsgroups, threaded discussions or emails. After adults come to recognize and organize the perspective of their learning, critical responses and feedback emerge. Interactions between instructors, other learners and content are a very crucial function in distance learning (Sherry *et al.*, 1998).

Collaborative learning

For social constructivists, learning should involve interaction with other people or environments, which foster potential development through instructors' guidance or in collaboration with more capable peers. Creating a social negotiation environment can foster reflective response and support collaborative construction (Jonassen, 1994). That is also what adult educators emphasize on the importance of critical thinking skills. On the other hand, if instruction uses cooperative learning properly, it can improve students' social skills or interpersonal skills. Furthermore, advanced technologies might overcome some of the barriers to learners' interaction and support collaborative work to synthesize shared knowledge. In other words, based on the principles of constructivism, online educators need to find ways to promote collaborative learning through reflection and social negotiation.

Facilitating learning

An effective educator should create a safe environment for learners to express themselves freely in appropriate ways, to share their ideas and to ask questions (Hamilton, 1996; Porter, 1997). While in this positive, safe and motivating environment, distance learners might feel free to fail and try again (Chen, 1997; Spitzer, 1998). No doubt, constructivism offers students more freedom to select and arrange their learning processes with other learners, while the teacher's role changes into a process facilitator (Westera, 1999). Instructors in constructivist approaches still have a responsibility to monitor and warrant the quality of learning and peer discussions (Westera, 1999). It is still necessary for the instructor to build in sufficient support, directions and guidelines for online learners.

Authentic learning

Constructivist theory emphasizes that learning should be authentic, and that learning needs to meet real life experiences. Jonassen (1994, 35) stated, "Constructivists emphasize the design of learning environments rather than instructional sequences". Adult learners want to learn skills related to their real life or work experience. Thus,

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the belief for educators in teaching should be grounded in adults' experiences, and these experiences represent a valuable resource. The learning environment should provide real-world, case-based environments for meaningful and authentic knowledge. Practical learning such as games, case studies, or internship is the most important part of adult education (Brookfield, 1995). Instruction should be anchored in real-world problems, events or issues which may be appealing and meaningful to adult learners (Bostock, 1998). In order to avoid pre-authentication, instructors should consider carefully the characteristics of adult learners. Learners can participate actively the course design including course objectives, prerequisites, the grading scheme, and teaching materials. As a consequence, the knowledge for adult learners is meaningful and authentic.

Learner-centered learning

Constructivism and Androgogy are similar in stressing ownership of the learning process by learners, experiential learning and a problem-solving approach to learning (Knowles *et al.*, 1998). Generally speaking, some assumptions set for adult distance learners are that they are highly autonomous, self-directed, motivated and individually different (Brookfield, 1995; Chen, 1997; Spitzer, 1998; Wagner and McCombs, 1995). It can be seen that the assumptions of distance learning for adults meet the expectations of Learner Centered Psychological Principles (American Psychological Association, 1993). Wagner and McCombs (1995), given that expectations for encouraging lifelong learning, favor learner-centered design of instruction which encourages learners as active participants in designing the learning plans. In addition, self-directed learners are highly motivated, know what they want to learn, set their objectives, find resources and evaluate their learning progress to meet their goals (Cranton, 1994).

High quality learning

Constructivism focuses on learner's control of learning processes and it narrows the gap between the school world and real-life society. By contrast with traditional instructional media, online learning environments give much greater freedom of control to the user (Laurillard, 1998). When hypermedia are integrated with the Internet, this system allows all individuals with browsers or search engines to transfer files and information from thousands of possible real-life sources to themselves. Learners should actively absorb external inputs and construct meaningful knowledge from their prior individual experience. Brookfield (1995) emphasized that adults require critical thinking skills to be able to challenge and guide their lives. That is, online learning should involve high-order thinking skills to learn how to determine the authenticity and quality of information by assessing the authority of the source and validating it from other sources. Learners must learn how to manage, analyze, critique, cross-reference, and transform information into valuable knowledge (Lundin, 1998).

A summary of constructivism applied to adult learning is included as Appendix A.

Conclusion

Advanced online technologies are gradually decreasing the barriers of traditional distance education comprised of interactive or communication problems. Instructional

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designers in distance education face the challenge of reflecting a philosophical and methodological shift. Constructivist principles provide ideas to help instructors create learner-centered and collaborative environments that support critical reflection and experiential processes (Jonassen *et al.*, 1995). Online discussion groups are characterized as being discussion-oriented, authentic, project-based, inquiry-focused, and collaborative. As Chen (1997, 34) noted, "Sound distance education is the result of effective communication and instruction and adherence to coherent instructional principles". Therefore, instructional strategies, subject matter, and instructional theories are other relevant variables for creating a better learning environment for online learners (Huang, 2000).

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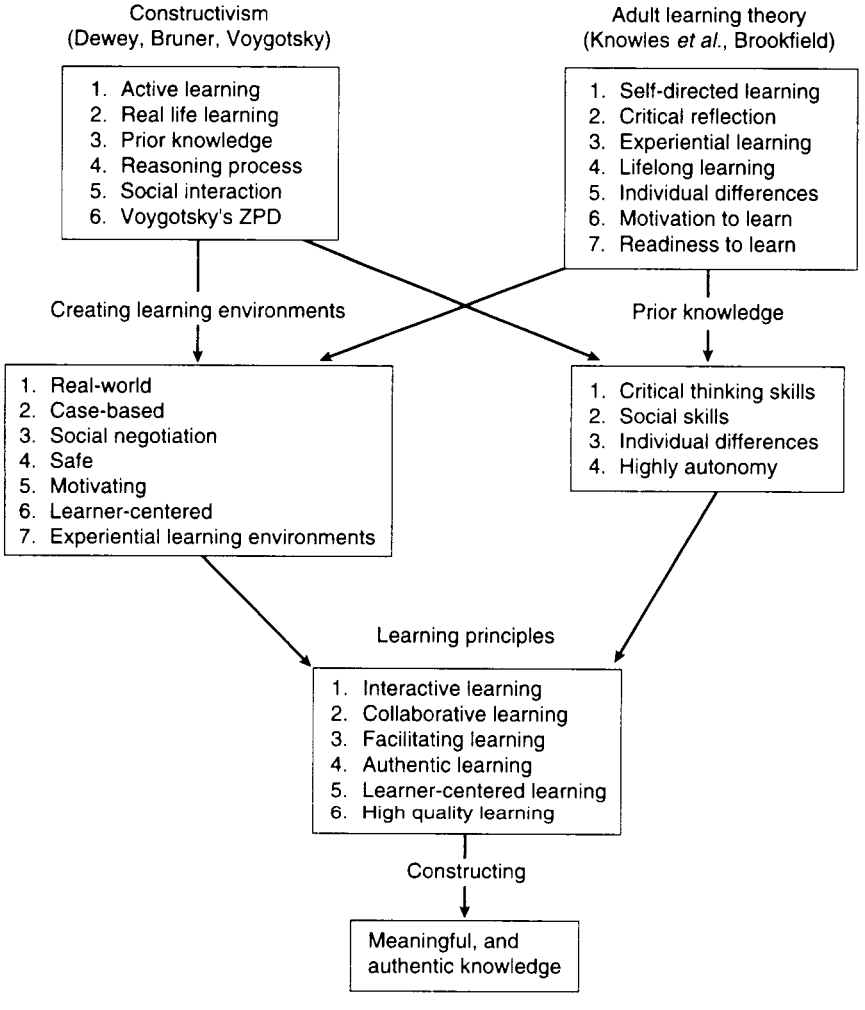
Appendix A: Constructivism applied in adult learning



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